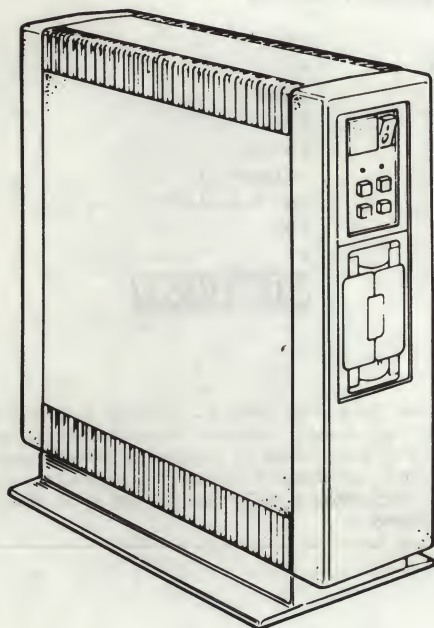


MicroVAX II 630QY, 630QZ

Technical Information

Order No. EK-005AA-IS-001



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Chapter 2: System Overview

The system is designed to provide a comprehensive overview of the project's goals and objectives.

1.1

1.2

The system is designed to provide a comprehensive overview of the project's goals and objectives.

The system is designed to provide a comprehensive overview of the project's goals and objectives.

1.3

The system is designed to provide a comprehensive overview of the project's goals and objectives.

The system is designed to provide a comprehensive overview of the project's goals and objectives.

Preface

This book summarizes technical information about the MicroVAX II 630QY, 630QZ system. The book is organized as follows:

- Chapter 1 describes the base system specifications, including the CPU module and associated memory options.
- Chapter 2 describes specifications for optional components available for the MicroVAX II 630QY, 630QZ system.
- Chapter 3 describes guidelines for expanding the system.

Index

1. The first part of the book is devoted to a general discussion of the theory of the firm. It begins with a review of the classical theory of the firm, which is based on the assumption of perfect competition and perfect information. This is followed by a discussion of the modern theory of the firm, which is based on the assumption of imperfect competition and imperfect information. The modern theory of the firm is then applied to the study of the behavior of the firm in a dynamic environment.
2. The second part of the book is devoted to a study of the behavior of the firm in a dynamic environment. It begins with a review of the classical theory of the firm, which is based on the assumption of perfect competition and perfect information. This is followed by a discussion of the modern theory of the firm, which is based on the assumption of imperfect competition and imperfect information. The modern theory of the firm is then applied to the study of the behavior of the firm in a dynamic environment.
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Chapter 1

Base System Specifications

The MicroVAX II 630QY, 630QZ base system includes a KA630-AA CPU module, and one or two MS630 memory modules. The MicroVAX II CPU normally resides in slot 1 of the backplane. It may not be installed in slots 4-8. Memory options may reside in slots 2 and 3.

1.1 Base System Operation

Base system operation includes the KA630 firmware and the controls on the CPU panel.

1.1.1 KA630 Firmware

Two read-only memory (ROM) chips on the KA630 module contain firmware. The firmware contains three major programs:

- A console program
- A set of self-tests for the CPU and memory
- A primary bootstrap program (VMB)

The console program receives control whenever the processor halts. For the KA630-AA CPU, a halt means only that processor control has passed to the console program, not that instruction execution stops. The standard VAX console functionality is emulated by executing a program in ROM, rather than by CPU microcode or a separate console program.

Control passes to the firmware when:

- The system is powered-up
- The Restart button is pressed

- The Q22-bus BHALT signal is asserted (typically by pressing the **Break** key or the Halt button when the Halt Enable/Disable switch is set to enable)
- A halt instruction is executed
- A system error occurs

At power-up, the system enters one of three power-up modes that are set using the Power-Up Mode switch on the CPU panel. (The modes and their meaning are described later in the chapter.) The console program then determines the console device type and console language.

The console program then runs the self-tests for the CPU and memory. The message

Performing normal system tests

is displayed on the terminal. As the tests progress, a countdown displays on the console terminal and on a LED display on the CPU panel. *MicroVAX II 630QY, 630QZ Operation* describes the power-on sequence and shows examples of successful power-on operations. *MicroVAX II 630QY, 630QZ Troubleshooting* describes possible problems that can occur during power-on.

If the self-tests are successful, the system does one of two things, depending on whether the Halt Enable/Disable switch on the CPU panel is set to disable or enable.

If the Halt Enable/Disable switch is set to disable, the CPU tries to load and start (bootstrap) an operating system. It locates a 64-Kbyte segment of system memory and copies a primary bootstrap program, called VMB, from the ROM chip into the base address plus 512. The CPU then begins executing VMB, which attempts to bootstrap an operating system from one of the devices in Table 1-1 in the order shown.

Table 1-1: Console Program Boot Sequence

Controller Type	Controller	Device Name
MSCP (Disk)	RQDX	DUm ¹ n
MSCP (Tape)	TQK50	MUm ¹ n
PROM	MRV11	PRAn
Ethernet adapter	DEQNA	XQAn

¹_m = MSCP controller designator (A = first, B = second, etc.) n = unit number

When VMB determines that a controller is present, it searches in order of increasing unit number for a bootable unit with a removable volume, then proceeds to the next controller. If it finds none, it will repeat the search for a nonremovable volume.

If halt is enabled, the console program enters console I/O mode in response to any halt condition, including system power-up. Console I/O mode allows you to control the system by typing commands at the console terminal.

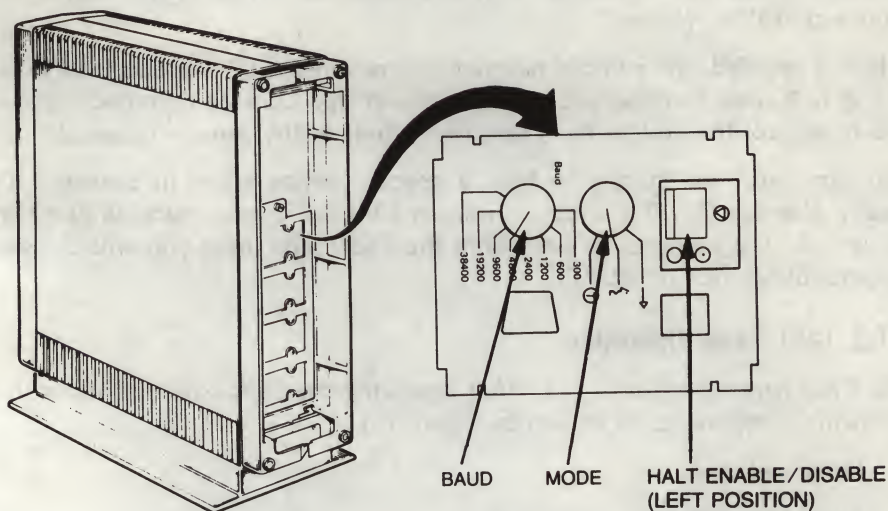
You can direct the system to boot a specific device when in console I/O mode. Use the **BOOT** command, followed by the device name as listed in Table 1-1. For example, to boot from the TK50 tape drive you would issue the command: **BOOT MUA0**.

1.1.2 CPU Panel Operation

The CPU panel (accessible only after removing the back cover) contains the following components as shown in Figure 1-1.

- Three switches
- One LED display
- One external connector for the console terminal serial line unit (SLU)
- One battery backup unit (BBU) for the time-of-year clock and language selection

Figure 1-1: Controls on the CPU Panel



MLO-667-85

1.1.2.1 Switches

The three switches on the CPU panel operate as described in the following sections.

Halt Enable/Disable Switch (2-position toggle)

Switch Position	Function
Dot outside circle (left)	Halt disable (factory setting). On power-up or restart, the system attempts to load software from one of the boot devices at the completion of self-tests.
Dot inside circle (right)	Halt enable. On power-up or restart, the system enters console I/O mode at the completion of self-tests.

Power-Up Mode Switch (3-position rotary)

Switch Position	Mode
Arrow	Run (factory setting). If the console terminal supports Multinational Character Sets (MCS), the user is prompted for language on power-up and restart only if the battery backup has failed. Full start-up diagnostics are run.
Human profile	Language inquiry. If the console terminal supports Multinational Character Sets (MCS), the user is prompted for language on every power-up and restart. Full start-up diagnostics are run.
T in a circle	Test. ROM programs run wraparound serial line unit (SLU) tests.

Baud Rate Switch (8-position rotary)

The baud rate switch has eight possible settings:

- 300
- 600
- 1200
- 2400
- 4800
- 9600
- 19200
- 38400

To change the baud rate, rotate the switch.

1.1.2.2 LED display

The LED display on the CPU panel displays a countdown sequence as the system runs its self-test diagnostics and bootstrap routine. The countdown begins with F (16 in hexadecimal) to 0. (The same display appears on the console terminal beginning with 7.) See *MicroVAX II 630QY, 630QZ Operation* for examples of successful power-on sequences, and *MicroVAX II 630QY, 630QZ Troubleshooting* for examples of problems you may encounter during power-on.

1.1.2.3 Console Terminal Connector

The console cable is connected to the CPU panel as shown in Figure 1-1.

1.1.2.4 Battery Backup Unit (BBU)

A battery backup unit (BBU), located on the inside of the CPU panel, provides power for maintaining the correct time-of-year and language selection when power to the system is turned off. Both the time-of-year and language selection code are lost if the BBU fails. The BBU provides power for up to ten days if the system power is turned off.

1.2 Base System Specifications

1.2.1 KA630 Processor Specifications

The KA630 is a Q22-bus compatible VAX CPU, based on the MicroVAX chip set.

Central Processor

Clock rate	20 megaHertz
Data path width	32 bits
Number of data types	Hardware: 9 Software emulated: 7
Number of instructions	Hardware: 245 Software emulated: 59
General purpose registers	16 (32-bit wide)
Addressing modes	General register: 8 Program counter: 4 Index:
PDP-11 compatibility mode	Emulated in software
Time bases	Time-of-year clock: 1 Interval timer: 1 (10 millisecond)
I/O bus interface	One Q22-bus interface with 8096 entry map

Memory Management and Control

Page size	512 bytes
Virtual address space	4 gigabytes
Physical memory space	16 Mbytes
Number of memory modules	2 maximum
On-board memory	1 Megabyte

Performance

Instruction prefetch buffer size	8 bytes
Translation buffer	Direct mapped
Size	8 entry
Associativity	Fully associative
On-board memory cycle time	400 nanoseconds
I/O bus buffer size	
Input	32 bytes
Output	4 bytes
Maximum I/O bandwidth	
DMA Read	2.6 Mbytes/second
DMA Write	3.3 Mbytes/second

Console Serial Line

Interface standards	EIA RS-423A/CCITT V.10 X.26 EIA RS-232C/CCITT V.28
Data format	1 start bit, 8 data bits, 0 parity bits, 1 stop bit
Baud rates	300, 600, 1200, 2400, 4800, 9600, 19200, 38400

Ordering Information

M7606	KA630-AA CPU module only
CK-KA630-AF	KA630-A cabinet kit

Configuration Information

Form factor	Quad height
Power requirements	+5 Vdc, 6.2 A
	+12 Vdc, 0.14 A
Bus loads	2.7 ac
	1.0 dc

Operating System Support

MicroVMS	Version 4.1m and later
ULTRIX-32m	Version 1.1 and later
VAXELN	Version 2.0 and later

Diagnostic Support

MicroVAX Diagnostic Monitor	All versions
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Related Documentation

EK-KA630-UG	MicroVAX 630 CPU Module User's Guide
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1.2.2 MS630 Memory Options

Four MS630 memory options are available for MicroVAX systems. One or two MS630 modules can be used in the MicroVAX system. The MS630 modules interface with the KA630-AA CPU through the MicroVAX local memory interconnect, made up of the CD rows of slots 1 through 3 of the backplane and a 50-pin cable.

CAUTION: MS630-B and -C modules can only be installed in slots 2 or 3 of the BA23 enclosure. Installing them in backplane slots that have Q22-bus signals in the CD rows may damage the MS630 modules as well as other modules in the backplane. MS630-AA modules can only be installed in the CD rows of slots 2 and 3 of the BA23 enclosure.

1.2.2.1 MS630-AA

The MS630-AA memory option is a 1-Mbyte, 36-bit wide array (32-bit data and 4 parity bits) implemented with 256-Kbyte dynamic RAMs in dual in-line packages (DIPS).

Performance

Cycle time	400 nanoseconds
------------	-----------------

Ordering Information

M7607-AA	1-Mbyte module ¹
----------	-----------------------------

Configuration Information

Form factor	Dual height
Power requirements	+5 Vdc, 1.0 A +12 Vdc, 0.0 A
Bus loads	0.0 ac 0.0 dc

Operating System Support

MicroVMS	Version 4.1m and later
ULTRIX-32m	Version 1.1 and later
VAXELN	Version 2.0 and later

Diagnostic Support

MicroVAX Diagnostic Monitor	All versions
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¹50-pin CPU memory interconnect cable included

1.2.2.2 MS630-BA

The MS630-BA memory option is a 2-Mbyte, 36-bit wide array (32-bit data and 4 parity bits) implemented with 256-Kbyte dynamic RAMs in dual in-line packages (DIPS).

Performance

Cycle time	400 nanoseconds
------------	-----------------

Ordering Information

M7608-AA	2-Mbyte module ¹
----------	-----------------------------

Configuration Information

Form factor	Dual height
Power requirements	+5 Vdc, 1.3 A +12 Vdc, 0.0 A
Bus loads	0.0 ac 0.0 dc

Operating System Support

MicroVMS	Version 4.1m and later
ULTRIX-32m	Version 1.1 and later
VAXELN	Version 2.0 and later

Diagnostic Support

MicroVAX Diagnostic Monitor	All versions
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¹50-pin CPU memory interconnect cable included

1.2.2.3 MS630-BB

The MS630-BB memory option is a 4-Mbyte, 36-bit wide array (32-bit data and 4 parity bits) implemented with 256-Kbyte dynamic RAMs in dual in-line packages (DIPS).

Performance

Cycle time	400 nanoseconds
------------	-----------------

Ordering Information

M7608-BB	4-Mbyte module ¹
----------	-----------------------------

Configuration Information

Form factor	Quad height
Power requirements	+5 Vdc, 1.8 A +12 Vdc, 0.0 A
Bus loads	0.0 ac 0.0 dc

Operating System Support

MicroVMS	Version 4.1m and later
ULTRIX-32m	Version 1.1 and later
VAXELN	Version 2.0 and later

Diagnostic Support

MicroVAX Diagnostic Monitor	All versions
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¹50-pin CPU memory interconnect cable included

1.2.2.4 MS630-CA

The MS630-CA memory option is an 8-Mbyte, 36-bit wide array (32-bit data and 4 parity bits) implemented with 256-Kbyte dynamic RAMs in zig-zag in-line packages (ZIPS).

Performance

Cycle time	400 nanoseconds
------------	-----------------

Ordering Information

M7609-CA	8-Mbyte module ¹
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Configuration Information

Form factor	Quad height
Power requirements	+5 Vdc, 2.11 A +12 Vdc, 0.0 A
Bus loads	0.0 ac 0.0 dc

Operating System Support

MicroVMS	Version 4.1m and later
ULTRIX-32m	Version 1.1 and later
VAXELN	Version 2.0 and later

Diagnostic Support

MicroVAX Diagnostic Monitor	All versions
Self-tests	Tested by KA630 self-test

¹50-pin CPU memory interconnect cable included

Chapter 2

Option Specifications

This chapter describes the options currently available for the MicroVAX II 630QY, 630QZ system. Some of the options described in this chapter are already installed. If you want to add other options to your system, your DIGITAL sales representative can advise you. Chapter 3 offers some guidelines on determining what options you can add to your system.

Options must be properly configured so that the system recognizes them. Each module in a system has a device address, commonly referred to as a Control and Status Register (CSR) address, and an interrupt vector that must be set when the option is installed. Options are usually configured by adjusting switches or jumpers. Your DIGITAL service representative configures the option properly when he/she installs the option in your system.

Self-maintenance customers can find information on setting CSR addresses and interrupt vectors in the *MicroVAX System Maintenance Guide*.

Descriptions of options in this chapter are grouped as follows:

- Mass storage options
- Communications options
- Real-time options
- Printer options

Descriptions of options include the following:

- Functional information
- Ordering information
- Performance
- Configuration information

- Operating system support
- Diagnostic support
- Related documentation

2.1 Mass Storage Options

The MicroVAX II 630QY, 630QZ system has two types of mass storage options: disk drives and tape drives. Each drive has a controller that directs its activity. The following sections describe each controller and the devices it controls.

2.1.1 Disk Drives and Controllers

The MicroVAX II 630QY, 630QZ system has two controller options that support disk drives.

- RQDX3 controller
- RRD50 controller

2.1.1.1 RQDX3 Controller

The RQDX3 is an intelligent controller with an on-board microprocessor. The controller is used to interface RD50 series fixed-disk drives and RX50 and RX33 diskette drives to the Q22-bus.

The RQDX3 can control a maximum of four drives. (Only one fixed-disk drive can be installed in the 630QY, 630QZ. The RX50, a dual diskette drive, counts as two drives.)

Functional Information

Controller protocol	MSCP
Supported drives	RX33, RX50, RD52, RD53, RD54
Drives per controller	4
Drive interconnect	Radial (TTL open collector)
Bad block replacement	Yes
Controllers per system	1 maximum

Ordering Information

RQDX3-BA	RQDX3 controller kit
M7555	RQDX3 module
M9058	Signal distribution board

Performance Optimizations

Read/Write data transfers	Up to 32-byte block mode DMA
Data buffering	8.5 Kbyte (1 sector)
Command buffering	12 (V1.0), 16 (V2.0)

Configuration Information

Form factor	Dual height
Power requirements	+5 Vdc, 2.48 A (typical) +12 Vdc, 0.06 A (typical)
Bus loads	1.9 ac 0.5 dc

Operating System Support

MicroVMS	Version 4.2 and later
ULTRIX-32m	Version 1.1 and later
VAXELN	Version 2.0 and later

Diagnostic Support

MicroVAX Diagnostic Monitor	Revision 1.06 and later
Self-tests	Yes

Related Documentation

EK-RQDX3-UG	RQDX3 Controller Module User's Guide
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RX50 Diskette Drive

The RX50 diskette drive is a random access, dual-diskette drive that uses two single-sided 5.25-inch RX50 diskettes.

Storage Capacity

Per diskette	409,600 bytes
Per track (10 sectors)	5,120 bytes
Per sector (1 logical block)	512 bytes

Performance

Average seek time	164 milliseconds
Average rotational latency	100 milliseconds
Average access time	264 milliseconds
Transfer rate	12.8 Kbytes/second

Physical Specifications

Height	8.25 cm (3.25 in)
Width	14.60 cm (5.75 in)
Depth	21.60 cm (8.50 in)
Weight	2.80 kg (4.18 lb)

Ordering Information

RX50A-AA	RX50 drive and cabinet kit
RX50-A	RX50 diskette drive

Configuration Information

Form factor	Standard 5.25-inch footprint
Power Requirements	+5 Vdc, 0.85 A
	+12 Vdc, 1.8 A

Operating System Support

MicroVMS	Version 4.1m and later
ULTRIX-32m	Version 1.1 and later
VAXELN	Version 2.0 and later

Diagnostic Support

MicroVAX Diagnostic Monitor	All revisions
Self-tests	None

Related Documentation

EK-LEP01-OM	RX50-D, -R Dual Flexible Disk Drive Subsystem Owner's Manual
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RX33 Diskette Drive

The RX33 is a 5.25-inch, double-sided, half-height diskette drive. It has two operating speeds, one for normal and one for high density diskettes. The RX33 provides full read/write compatibility with an RX50 single-sided drive. The RX33 also provides an industry-standard 1.6-megabyte capacity with the RX33 media installed.

Storage Capacity

Normal density (RX50 diskette)

Per drive	409.6 Kbytes
Per surface	409.6 Kbytes
Per track	5.12 Kbytes

High density (RX33 diskette)

Per drive	1.23 Mbytes
Per surface	614.4 Kbytes
Per track	7.68 Kbytes

Performance

Normal density (RX50 diskette)

Average seek time	95 milliseconds
Average rotational latency	100 milliseconds
Average access time	195 milliseconds
Transfer rate	31 Kbytes/second

High density (RX33 diskette)

Average seek time	92 milliseconds
Average rotational latency	83 milliseconds
Average access time	175 milliseconds
Transfer rate	62 Kbytes/second

Physical Specifications

Height	4.3 cm (1.69 in)
Width	14.6 cm (5.75 in)
Depth	20.32 cm (8 in)
Weight	1.31 kg (2.9 lb)

Ordering Information

RX33-A	RX33 diskette drive
RX33A-AA	RX33-A with cable to distribution panel

Operating System Support

MicroVMS	Version 4.2 and later
ULTRIX-32m	Version 1.1 and later
VAXELN	Version 2.0 and later

Diagnostic Support

MicroVAX Diagnostic Monitor	Revision 1.16 and later
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Related Documentation

EK-RX33T-TM

RX33 Diskette Drive Technical Description
Manual

RD52 Disk Drive

The RD52 disk drive is a fixed-disk drive with a formatted storage capacity of 31 Mbytes.

Ordering Information

RD52A-AA

RD52 disk kit

Storage Capacity

Total capacity 33,554,532 bytes¹

User capacity 30,956,760 bytes¹

User capacity (blocks) 60,480 blocks¹

Performance

Average seek time 49.00 milliseconds

Average rotational latency 8.33 milliseconds

Average access time 57.33 milliseconds

Transfer rate 184.32 Kbytes/second¹

Physical Specifications

Height 8.25 (3.25 in)

Width 14.60 cm (5.75 in)

Depth 20.32 cm (8.00 in)

Weight 3.18 kg (7.00 lb)

¹When operating with the RQDX3 controller

Configuration Information

Form factor	Standard 5.25-in footprint
Power requirements	+5 Vdc, 1.0 A +12 Vdc, 2.5 A
Bus loads	0.0 ac 0.0 dc

Operating System Support

MicroVMS	Version 4.1m and later
ULTRIX-32m	Version 1.1 and later
VAXELN	Version 2.0 and later

Diagnostic Support

MicroVAX Diagnostic Monitor	Revision 1.02 and later
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Related Documentation

EK-LEP04-OM	RD52-D, -R Fixed Disk Drive Subsystem Owner's Manual
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RD53 Disk Drive

The RD53 disk drive is a fixed-disk drive with a formatted storage capacity of 71 Mbytes.

Ordering Information

RD53A-AA	RD53 disk kit
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Storage Capacity

Total capacity	71,000,064 bytes ¹
User capacity	70,987,776 bytes ¹
User capacity (blocks)	138,672 blocks ¹

Performance

Average seek time	30.00 milliseconds
Average rotational latency	8.33 milliseconds
Average access time	38.33 milliseconds
Transfer rate	552.96 Kbytes/second ¹

Physical Specifications

Height	8.25 cm (3.25 in)
Width	14.60 cm (5.75 in)
Depth	20.32 cm (8.00 in)
Weight	3.18 kg (7 lb)

Configuration Information

Form factor	Standard 5.25-in footprint
Power requirements	+5 Vdc, 0.9 A +12 Vdc, 2.5 A
Bus loads	0.0 ac 0.0 dc

Operating System Support

MicroVMS	Version 4.1m and later
ULTRIX-32m	Version 1.1 and later
VAXELN	Version 2.0 and later

¹When operating with the RQDX3 controller

Diagnostic Support

MicroVAX Diagnostic Monitor

Revision 1.02 and later

Related Documentation

EK-LEP06-OM

RD53-D Fixed Disk Drive Subsystem Owner's Manual

RD54 Drive

The RD54 disk drive is a fixed-disk drive with a formatted storage capacity of 159 Mbytes.

Ordering Information

RD54A-AA

RD54 disk kit

Storage Capacity

Total capacity 191,394,000 bytes

User capacity 159,334,000 bytes

User capacity (blocks) 311,200 blocks

Performance

Average seek time 30.00 milliseconds

Average rotational latency 8.33 milliseconds

Average access time 38.33 milliseconds

Transfer rate 552.96 Kbytes/second

Physical Specifications

Height 8.25 cm (3.38 in)

Width 14.60 cm (5.75 in)

Depth 20.32 cm (8.20 in)

Weight 2.8 kg (6.3 lb)

Configuration Information

Form factor	Standard 5.25-in footprint
Power requirements	+5 Vdc, 1.7 A +12 Vdc, 1.57 A
Bus loads	0.0 ac 0.0 dc

Operating System Support

MicroVMS	Version 4.2 and later
ULTRIX-32m	Version 1.2 and later
VAXELN	Version 2.1 and later

Diagnostic Support

MicroVAX Diagnostic Monitor	Revision 1.14 and later
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Related Documentation

EK-LEP07-OM	RD54 Fixed Disk Drive Subsystem Owner's Manual
EK-RD54A-TM	RD54 Technical Manual

2.1.1.2 RRD50 Disk Subsystem

The RRD50 subsystem is a read-only storage device that reads data stored on 11.75-cm (4.7-in) optical disks. One optical disk stores 600 Mbytes of data. The RRD50 subsystem includes the RRD50 controller and the drive.

Functional Information

Controller protocol	MSCP
Drives per controller	2
Drive interconnect	Direct
Storage capacity	600 Mbytes

Ordering Information

RRD50-A2	RRD optical disk drive subsystem (includes disk drive, controller, and cables) for 100/120 V
RRD50-A3	RRD optical disk drive subsystem (includes disk drive, controller, and cables) for 220/240 V

Performance

Average access time	1.5 second
Transfer rate	150 Kbyte/second
Read data transfer	Up to 16-byte block mode DMA

Configuration Information

Form factor	Dual height
Power requirements	+5 Vdc, 3.0 A +12 Vdc, 0.0 A
Bus loads	0.5 ac 0.5 dc

Operating System Support

MicroVMS	Version 4.2 and later
ULTRIX-32m	Not supported as of Version 1.1
VAXELN	Not supported as of Version 2.0

Diagnostic Support

MicroVAX Diagnostic Monitor	Revision 1.08 and later
Self-tests	Yes

Related Documentation

EK-RRD50-UG	RRD50 Digital Disk Drive User's Guide
EK-RRD50-PS	RRD Subsystem Pocket Service Guide

2.1.2 Tape Drives and Controllers

The MicroVAX II 630QY, 630QZ system has two controllers that support tape drives.

- TQK50 controller
- TSV05 controller

2.1.2.1 TQK50 Controller

The TQK50 controller module provides the interface between the TK50-AA tape drive and the Q22-bus. The controller uses the Tape Mass Storage Control Protocol (TMSCP).

Functional Information

Controller protocol	TMSCP
Supported drives	TK50
Drives per controller	1
Drive interconnect	Direct

Ordering Information

TQK50-AA	TQK50 controller subsystem
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Performance

Data throughput rate	45 Kbytes/second
Read/Write data transfers	Up to 8-byte burst mode DMA

Configuration Information

Form factor	Dual height
Power requirements	+5 Vdc, 2.9 A +12 Vdc, 0.0 A
Bus loads	2.8 ac 0.5 dc

Operating System Support

MicroVMS	Version 4.1m and later
ULTRIX-32m	Version 1.1 and later
VAXELN	Version 2.0 and later

Diagnostic Support

MicroVAX Diagnostic Monitor	Revision 1.03 and later
Self-tests	Yes

TK50 Tape Drive

The TK50 is a streaming tape drive subsystem that can store up to 96 Mbytes on a tape cartridge for backup data storage.

Ordering Information

TQK50-AA	TQK50 controller subsystem
TK50-AA	TK50 tape drive and blank cartridge

Operating System Support

MicroVMS	Version 4.1m and later
ULTRIX-32m	Version 1.1 and later
VAXELN	Version 2.0 and later

Diagnostic Support

MicroVAX Diagnostic Monitor	Revision 1.03 and later
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Functional Specifications

Recording media	Magnetic tape
Tape dimensions	0.5 in wide, 600 ft long
Mode of operation	Streaming
Read/Write method	Serpentine
Recording density	6667 bits/in
Number of tracks	22

Storage capacity

Unformatted	131.0 Mbytes
Formatted	94.5 Mbytes

Performance

Tape start time	300 milliseconds maximum
Tape speed	75 in/sec
Streaming data rate	62 Kbytes/sec
Access time (from insertion of new tape)	35 minutes maximum

Physical Specifications

Height	8.25 cm (3.25 in)
Width	14.60 cm (5.75 in)
Depth	21.44 cm (8.44 in)
Weight	2.27 kg (5 lb)

Related Documentation

EK-LEP05-OM	TK50 Tape Drive Subsystem Owner's Manual
EK-OTK50-TM	TK50 Tape Drive Subsystem Technical Manual

2.1.2.2 TSV05 Tape Drive Controller

The TSV05 tape drive controller is used to interface the TS05 tape drive.

Functional Information

Controller protocol	Controller unique
Supported drives	TS05
Drives per controller	1
Drive interconnect	Direct

Ordering Information

TSV05-SZ	TSV05 tape drive system (120 V)
TSV05-ZB	TSV05 tape drive system (240 V)
TS05-AA	TS05 tape drive
M7196	TSV05 tape controller

Performance

Buffer size	3.5 Kbytes
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Configuration Information

Form factor	Quad height
Power requirements	+5 Vdc, 6.5 A (typical) +12 Vdc, 0.0 A (typical)
Bus loads	3.0 ac 1.0 dc

Operating System Support

MicroVMS	Version 4.2 and later
ULTRIX-32m	Version 1.1 and later
VAXELN	None

Diagnostic Support

MicroVAX Diagnostic Monitor	Revision 1.06 and later
Self-tests	None

Related Documentation

EK-TSV05-UG	TSV05 Tape Transport System User's Guide
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2.2 Communications Options

Communications options are divided into asynchronous and synchronous devices.

2.2.1 Asynchronous Devices

2.2.1.1 DHV11 Asynchronous Multiplexer

The DHV11 is an asynchronous multiplexer that supports eight serial lines for data communication with limited modem control.

Functional Information

Supported line interfaces	EIA RS423-A/CCITT V.28 EIA 232-C/CCITT V.24
Split speed operation	All lines
Flow control (XON/XOFF)	All lines
Operating mode	Full and half-duplex
Supported data formats	16 programmable formats (each with 1 start bit) <ul style="list-style-type: none">• 5, 6, 7 or 8 data bits, 0 or 1 parity bits and 1 stop bit• 5 data bits, 0 or 1 parity bits and 1.5 stop bits• 6, 7 or 8 data bits, 0 or 1 parity bits and 2 stop bits Parity, if enabled, can be either odd or even.
Modem control	Full
Supported modems	DIGITAL: DF01, DF02, DF03, DF112 Bell: 103, 113, 212

Ordering Information

M3104	DHV11 module only
CK-DHV11-AB	DHV11 cabinet kit. Includes two type B filter connectors and the appropriate pair of cables.
External cable	BC22K full modem support BC22E limited modem support BC22D VT series terminals

Performance

Transmit data transfers	Single-character programmed transfers or up to 16-character block mode DMA transfers
Receive data transfers	Single-character programmed transfers
Transmit buffer size	One character for programmed transfers 64-character FIFO for DMA transfers
Receive buffer size	256-character FIFO
Supported baud rates	16 programmable baud rates: 50, 75, 110, 134.5, 150, 300, 600, 1200, 1800, 2000, 2400, 4800, 7200, 9600, 19200, 38400 ¹
Throughput at maximum baud rate:	
Transmit	1,000 characters/second in single-character transfer mode 2,000 characters/second in DMA mode
Receive	4,000 characters/second

Configuration Information

Form factor	Quad height
Power requirements	+5 Vdc, 4.3 A (typical) +12 Vdc, 0.48 A (typical)
Bus loads	2.9 ac 1.0 dc
Insert panels	2 type B
Insert panel connectors	4 subminiature 25-pin male D-type connectors

Operating System Support

MicroVMS	Version 4.1m and later
ULTRIX-32m	Version 1.1 and later
VAXELN	Version 2.0 and later

¹38400 baud rate is not supported by DIGITAL operating systems.

Diagnostic Support

MicroVAX Diagnostic Monitor	All revisions
Self-tests	Yes

Related Documentation

EK-DHV11-TM	DHV11 Technical Manual
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2.2.1.2 DZV11 Asynchronous Multiplexer

The DZV11 is an asynchronous multiplexer that supports four serial lines for data communication with limited modem control.

Functional Information

Supported line interfaces	EIA 232-C/CCITT V.28
Split speed operation	All lines
Flow control (XON/XOFF)	All lines
Supported data formats	18 programmable formats (each with 1 start bit) <ul style="list-style-type: none">• 5, 6, 7 or 8 data bits, 0 or 1 parity bits and 1 stop bit• 5 data bits, 0 or 1 parity bits and 1 or 1.5 stop bits• 6, 7 or 8 data bits, 0 or 1 parity bits and 2 stop bits
Modem control	Parity, if enabled, can be either odd or even.
Support modems	Autoanswer with full-duplex modems Bell 103, 113, 212

Ordering Information

M7957	DZV11 module only
CK-DZV11-DB	DZV11 cabinet kit. Includes one type B filter connector and a 36-in internal cable.

Ordering Information

External cable	BC22D for VT series terminals BC22E for DF100-200 series asynchronous modems
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Performance

Transmit data transfers	Single-character programmed transfers
Receive data transfers	Single-character programmed transfers
Transmit buffer size	One character for programmed transfers
Receive buffer size	256-character FIFO
Supported baud rates	15 programmable baud rates: 50, 75, 110, 134.5, 150, 300, 600, 1200, 1800, 2000, 2400, 3600, 4800, 7200, 9600
Throughput at maximum baud rate:	10,970 characters/second

Configuration Information

Form factor	Quad height
Power requirements	+5 Vdc, 1.15 A (typical) +12 Vdc, 0.39 A (typical)
Bus loads	3.9 ac 1.0 dc
Insert panels	1 type B
Insert panel connectors	4 subminiature 25-pin male D-type

Operating System Support

MicroVMS	Version 4.1m and later
ULTRIX-32m	Version 1.1 and later
VAXELN	Version 2.0 and later

Diagnostic Support

MicroVAX Diagnostic Monitor	All revisions
Self-tests	Yes

Related Documentation

EK-DZV11-TM	DZV11 Asynchronous Multiplexer Technical Manual
EK-DZV11-UG	DZV11 Asynchronous Multiplexer User's Guide

2.2.1.3 DZQ11 Asynchronous Multiplexer

The DZQ11 is an asynchronous multiplexer that supports four serial lines for data communication with limited modem control. The DZQ11 permits dial-up (autoanswer) operation with modems using full-duplex operations.

Functional Information

Supported line interfaces	EIA RS423-C/CCITT V.24 EIA 232-C/CCITT V.28
Split speed operation	No
Flow control (XON/XOFF)	All lines
Supported data formats	18 programmable formats (each with 1 start bit) <ul style="list-style-type: none">• 5, 6, 7 or 8 data bits, 0 or 1 parity bits and 1 stop bit• 5 data bits, 0 or 1 parity bits 1 or 1.5 stop bits• 6, 7 or 8 data bits, 0 or 1 parity bits and 2 stop bits
Modem control	Parity, if enabled, can be either odd or even. Limited
Supported modems	DIGITAL: DF01, DF02, DF03, DF112 Bell: 103, 113, 212

Ordering Information

M3106	DZQ11 module only
CK-DZQ11-DFB	DZQ11 cabinet kit. Includes one type B filter connector and a 36-in internal cable.
External cable	BC22D for VT series terminals BC22E for DF100-200 series asynchronous modems

Performance

Transmit data transfers	Single-byte programmed transfers
Receive data transfers	Single-byte programmed transfers
Transmit buffer size	One byte for programmed transfers
Receive buffer size	64-character FIFO
Supported baud rates	15 programmable baud rates: 50, 75, 110, 134.5, 150, 300, 600, 1200, 1800, 2000, 2400, 4800, 7200, 9600, 19200
Throughput at maximum baud rate: 5 data bits, 0 parity bits, 1 stop bit	10,970 characters/second (all lines)

Configuration Information

Form factor	Dual height
Power requirements	+5 Vdc, 1.1 A (typical) +12 Vdc, 0.24 A (typical)
Bus loads	1.5 ac 1.0 dc
Insert panels	1 type B
Insert panel connectors	4 subminiature 25-pin male D-type connectors

Operating System Support

MicroVMS	Version 4.1m and later
ULTRIX-32m	Version 1.1 and later
VAXELN	Version 2.0 and later

Diagnostic Support

MicroVAX Diagnostic Monitor	All revisions
Self-tests	Yes

Related Documentation

EK-DZQ11-UG	DZQ11 Asynchronous Multiplexer User's Guide
EK-DZQ11-TM	DZQ11 Asynchronous Multiplexer Technical Manual

2.2.1.4 DLVJ1 Asynchronous Interface

The DLVJ1 is an asynchronous interface that connects up to four separate lines to the Q-bus. The DLVJ1 was previously known as the DLV11-J.

Functional Information

Supported line interfaces	EIA RS423-A/CCITT V.10 EIA RS422 EIA 232-C/CCITT V.28
Split speed operation	No
Flow control (XON/XOFF)	All lines
Supported data formats	Selected by installing and removing jumpers. Factory configuration is 8 data bits, 1 start bit, and 1 stop bit. <ul style="list-style-type: none">• 7 or 8 data bits, 1 or 2 parity bits, and 1 or 2 stop bits Parity, if enabled, can be either odd or even.
Modem control	Limited

Ordering Information

M8043	DLVJ1 module only
CK-DLVJ1-LB	DLVJ1 cabinet kit for EIA 423-A/CCITT V.10, EIA 232-C/CCITT V.28. Includes one type B filter connector and a 36-in cable.
CK-DLVJ1-EB	DLVJ1 cabinet kit for EIA RS422.
External cables	BC22D for VT series terminal BC22E for DF100-200 series asynchronous modems

Performance

Transmit data transfers	Single-byte programmed transfers
Receive data transfers	Single-byte programmed transfers
Transmit buffer size	1 byte
Receive buffer size	1 byte
Supported baud rates	9 jumper-selectable baud rates: 150, 300, 600, 1200, 2400, 4800, 9600, 19200, 38400. ¹ The factory configuration is 9600 baud for Channels 0, 1, and 2 and 300 baud for Channel 3.

Configuration Information

Form factor	Dual height
Power requirements	+5 Vdc, 1.0 A (typical) +12 Vdc, 0.15 A (typical)
Bus loads	1.0 ac 1.0 dc
Insert panels	1 type B
Insert panel connectors	4 subminiature 25-pin male D-type connectors

¹38400 baud rate is not supported by DIGITAL operating systems.

Operating System Support

MicroVMS	None
ULTRIX-32m	None
VAXELN	Version 2.0 and later

Diagnostic Support

MicroVAX Diagnostic Monitor	All revisions
Self-tests	No

Related Documentation

EK-DLVJ1-UG	DLV11-J User's Guide
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2.2.1.5 KMV1A-M Programmable Communications Controller

The KMV1A-M is a medium-speed, programmable data communications interface for Q-bus systems. The KMV1A-M can be programmed to operate in asynchronous or synchronous mode.

Functional Information

Supported line interface	RS-232-C/V28
	RS-422-A/V11
	RS-423-A/V10
Supported protocol	Synchronous (bit-oriented or byte-oriented)
Split speed	Yes
Modem support	Full

Ordering Information

M7500	KMV1A-M module only
CK-KMV1A-AB	Cabinet kit for RS-232C/V23 interface
CK-KMV1A-EB	Cabinet kit for RS-422A/V11 interface
CK-KMV1A-FB	Cabinet kit for RS-423A/V10 interface

Performance

Transmit buffer size	1032 bytes
Supported baud rates	1200, 2400, 4800, 9600, 19200

Configuration Information

Form factor	Quad height
Power requirements	+5 Vdc, 2.6 A +12 Vdc, 0.2 A
Bus loads	1.0 dc 3.0 ac
Insert panels	1 type B

Operating System Support

MicroVMS	Version 4.2 and later
ULTRIX-32m	None
VAXELN	None

Diagnostic Support

MicroVAX Diagnostic Monitor	Revision 1.08 and later
Self-tests	Yes

Related Documentation

EK-KMV11-TM	KMV11 Programmable Communications Controller Technical Manual
EK-KMV11-UG	KMV11 Programmable Communications Controller User's Guide

2.2.2 Synchronous Devices

2.2.2.1 DMV11 Synchronous Controller

The DMV11 is an intelligent synchronous communications controller that provides high-speed communications for Q-bus systems in distributed networks. The DMV11 is available in four system options, each of which has a different interface capability. The option you choose depends on the interface requirements of your system. The options are as follows:

- DMV11-AP (EIA RS-232C/CCITT V.28)
- DMV11-BP (CCITT V.35/DDS)
- DMV11-CP (Integral modem)
- DMV11-FP (EIA RS-423A/CCITT V.24)

Functional Information

Supported Line Interface

DMV11-AP	EIA RS-232C/CCITT V.28
DMV11-BP	CCITT V.35/DDS
DMV11-CP	Integral modem
DMV11-FP	EIA RS-423A/CCITT V.24

Supported Protocol	Digital Data Communications Message Protocol (DDCMP) in either point-to-point or multipoint mode.
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Operating mode	Full or half-duplex
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Modem support	Full or limited
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Supported modems	All DIGITAL modems and the Bell 200 series
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Ordering Information

DMV11-AP (RS-232C/CCITT V.28 Interface)

M8053	Module only
BC22E	External cable for limited modem support
BC22F	External cable for full modem support
CK-DMV11-AB	Cabinet kit

DMV11-BP (CCITT V.35/DDS)

M8053	Module only
CK-DMV11-BB	Cabinet kit
BC17E-25	25-ft external modem cable

DMV11-CP (Integral modem)

M8064	Module only
CK-DMV11-CB	Cabinet kit

DMV11-CP (RS-423-A/CCITT V.24)

M8053	Module only
CK-DMV11-FB	Cabinet kit
BC55D	External cable

Performance

Transmit/Receive data transfers	Single DMA transfers
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Transmit/Receive buffer size	784 bytes
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Data rates

DMV11-AP	Up to 19.2 Kbits/second
DMV11-BP	Up to 56 Kbits/second
DMV11-CP	56 Kbits/second only
DMV11-FP	Up to 56 Kbits/second

Configuration Information

Form factor	Quad height
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Configuration Information

Power requirements

DMV11-AP, -BP, -FP	+5 Vdc, 4.7 A (typical)
	+12 Vdc, 0.38 A (typical)
DMV11-CP	+5 Vdc, 4.4 A (typical)
	+12 Vdc, 0.26 A (typical)

Bus loads

2.0 ac
1.0 dc

Insert panels

1 type A (-B and -C variants)
1 type B (-A and -F variants)

Operating System Support

MicroVMS	Version 4.2 and later
ULTRIX-32m	None
VAXELN	None

Diagnostic Support

MicroVAX Diagnostic Monitor	Revision 1.02 and later
Self-tests	None

Related Documentation

EK-DMV11-UG	DMV11 Synchronous Controller User's Guide
EK-DMV11-TM	DMV11 Synchronous Controller Technical Manual

2.2.2.2 DPV11 Synchronous Interface

The DPV11 connects the Q-bus to a modem, using a synchronous serial line. EIA compatibility is provided for use in local communications only (timing and data leads only). The DPV11 is intended for character-oriented protocols, such as Digital Data Communications Message Protocol (DDCMP), or communication protocols that are bit-oriented, such as Synchronous Data Line Control (SDLC).

Functional Information

Supported line interface	EIA RS-232C/CCITT V.28 EIA RS-423A EIA RS-422A
Supported protocols	Digital Data Communications Message Protocol (DDCMP) BISYNC SDLC
Operating mode	Full or half-duplex
Character size	Program selectable (5-8 bits with character-oriented protocols and 108 bits with bit-oriented protocols)
Modem support	Limited
Supported modems	All DIGITAL modems and the Bell 200 series

Ordering Information

M8020	Module only
CK-DPV11-AB	Cabinet kit

Performance

Transmit/Receive data transfers	Single-byte programmed transfer
Transmit buffer size	2 bytes
Receive buffer size	2 bytes
Data rate	56 Kbits/second

Configuration Information

Form factor	Dual height
Power requirements	+5 Vdc, 1.2 A (typical) +12 Vdc, 0.15 A (typical)

Configuration Information

Bus loads	1.0 ac 1.0 dc
Insert panels	1 type A
Insert panel connectors	40-pin Berg

Operating System Support

MicroVMS	Version 4.2 and later
ULTRIX-32m	None
VAXELN	None

Diagnostic Support

MicroVAX Diagnostic Monitor	All revisions
Self-tests	No

Related Documentation

EK-DPV11-UG	DPV11 Synchronous Interface User's Guide
EK-DPV11-TM	DPV11 Synchronous Interface Technical Manual

2.2.3 Ethernet Devices

2.2.3.1 DEQNA Ethernet Interface

The DEQNA is used to connect a Q-bus system to a local area network (LAN) based on Ethernet. Ethernet is a communications system that allows data exchange between computers within a moderate distance (2.8 km/1.74 mi).

Functional Information

Supported protocol	Ethernet
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Ordering Information

M7504	Module only
CK-DEQNA-KB	Cabinet kit
BNE3A-D	External cable

Performance

Transmit/Receive data transfers	Up to 32-byte block mode DMA
Transmit data transfers	2-Kbyte FIFO for DMA transfers
Receive data transfers	4-Kbyte FIFO for DMA transfers
Throughput at maximum rate	10 megabits/second

Configuration Information

Form factor	Dual height
Power requirements	+5 Vdc, 3.5 A +12 Vdc, 0.5 A
Bus loads	2.2 ac 0.5 dc
Insert panels	1 type A
Insert connectors	9-pin D-type

Operating System Support

MicroVMS	Version 4.1m or later
ULTRIX-32m	Version 2.0 or later
VAXELN	Version 1. or later

Diagnostic Support

MicroVAX Diagnostic Monitor	All revisions
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Related Documentation

EK-DEQNA-UG	DEQNA Ethernet User's Guide
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2.3 Real-Time Devices

2.3.1 DRV11-J Parallel Interface

The DRV11-J is a high-density, parallel interface with four bidirectional, 16-bit, parallel ports.

Functional Information

Number of lines	Total: 80 16 input/output data lines with individual interrupts 48 input/output data lines 8 input control lines 8 output control lines
Transmit/Receive data transfers	1- or 2-byte programmed transfers
Buffer size	2 bytes

Ordering Information

M8049	Module only
CK-DRV1J-KA	Cabinet kit

Performance

Line characteristics	Data line outputs (tri-state) $V(OL) = 0.5 \text{ V @ } I(OL) = 8 \text{ mA}$ $V(OL) = 0.4 \text{ V @ } I(OL) = 4 \text{ mA}$ $V(OH) = 2.4 \text{ V @ } I(OL) = -2.6 \text{ mA}$ Data line inputs $I(IL) = -0.2 \text{ mA @ } V(IL) = 0.4 \text{ V}$ $I(IH) = 20 \text{ } \mu\text{A @ } V(IH) = 2.7 \text{ V}$
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Performance

Control line outputs (tri-state) $V(OL) = 0.55 \text{ V @ } I(OL) = 64 \text{ mA}$ $V(OH) = 2.4 \text{ V @ } I(OH) = -15 \text{ mA}$ **Control line inputs**Termination = 120Ω $I(IL) = -27 \text{ mA @ } V(IL) = 0.5 \text{ V}$ $I(IH) = 80 \mu\text{A @ } V(IH) = 2.7 \text{ V}$

Configuration Information

Form factor

Dual height

Power requirements

+5 Vdc, 1.6 A (typical)

+12 Vdc, 0.0 A

Bus loads

2.0 ac

1.0 dc

Insert panels

2 type A

Operating System Support

MicroVMS

None as of Version 4.2

ULTRIX-32m

None as of Version 1.2

VAXELN

Version 2.0 and later

Diagnostic Support

MicroVAX Diagnostic Monitor

Revision 1.03 and later

Self-tests

Yes

Related Documentation

EK-DRV1J-UG

DRV11-J Interface User's Guide

2.3.2 DRV11-W Parallel Interface

The DRV11-W is a general-purpose, parallel interface with one 10-bit input port and one 16-bit output port. The DRV11 supports DMA.

Functional Information

Number of lines	Total: 50
	16 data output lines
	16 data input lines
	3 user-definable input status lines
	3-user-definable output control lines
	8 input control lines
	4 output control lines
Line characteristics	
Input data lines	1 TTL unit load each
Input control lines	1 TTL unit load each
Output data lines	10 TTL unit loads each
Output control lines	10 TTL unit loads each
Logic levels	High = logic 1
	Low = logic 0

Ordering Information

M7651	Module only
CK-DRV1B-KA	Cabinet kit

Performance

Transfer mode	Up to 2-byte programmed transfers
	Up to 8-byte burst mode DMA transfers and unlimited burst mode DMA transfers (unsupported)

Performance

Data transfer rate	Up to 250,000 16-bit words/second in single-cycle mode
	Up to 500,000 16-bit words/second in burst mode

Configuration Information

Form factor	Dual height
Power requirements	+5 Vdc, 1.8 A (typical)
Bus loads	2.0 ac
	1.0 dc
Insert panels	2 type A
Insert panel connectors	Two 40-pin connectors

Operating System Support

MicroVMS	Version 4.4 and later
ULTRIX-32m	None
VAXELN	None

Diagnostic Support

MicroVAX Diagnostic Monitor	Revision 1.0 and later
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Related Documentation

EK-DRVWA-UG	DRV11-WA General Purpose DMA User's Guide
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2.3.3 IEQ11 Controller

The IEQ11-A option is a DMA controller that interfaces a Q-bus system to two independent instrument buses (IEC/IEEE).

Functional Information

Supported interfaces	IEEE-488-1978 IEC 625-1
Supported interface functions	Automatic source handshake Automatic acceptor handshake Talker and extended talker (includes serial poll capability) Listener and extended listener Service request Remote local Parallel poll Device clear Device trigger Controller

Ordering Information

IEQ11-AC	IEQ11 system for IEEE connection
M8634	Module only
IEQ11-AD	IEQ11 system for IEC connection
M8654	Module only

Performance

Transfer mode	Programmed I/O transfers with interrupt DMA data transfers
Data transfer rate	Up to 150 Kbytes/second during a DMA block transfer

Configuration Information

Form factor	Quad height
Power requirements	+5 Vdc, 3.0 A (typical)

Configuration Information

Bus loads	2.0 ac 1.0 dc
Insert panels	1 type B for each IEEE/IEC bus
Insert panel connectors	Standard 24-pin IEEE 488 connector (IEQAA-AC) Standard 25-pin IEC 625 connector (IEQ11-AD)

Operating System Support

MicroVMS	Version 4.2 and later
ULTRIX-32m	Version 2.0 and later
VAXELN	None

Diagnostic Support

MicroVAX Diagnostic Monitor	Revision 1.08 and later
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Related Documentation

EK-IEUQ1-UG	IEU11-A/IEQ11-A User's Guide
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2.4 Printers and Printer Interfaces

MicroVAX II systems have the following types of printer options:

- Line printers
- Dot matrix printers
- Daisy wheel, letter-quality printers
- Laser printers

2.4.1 LPV11/LP25, LP26, LP27 Printer Subsystems

MicroVAX II systems have three line printer options: the LP25, LP26, and LP27 printers. All require the LPV11 printer interface.

LPV11 Printer Interface

The LPV11 printer interface controls the flow of data between the Q-bus and a line printer.

Ordering Information

LPV11-B	LPV11/LP25 printer system
LPV11-F	LPV11/LP26 printer system
LPV11-00	LPV11 controller module
CK-LPV1A-KA	LPV11 cabinet kit

Configuration Information

Form factor	Dual height
Power requirements	+5 Vdc, 0.8 A (typical) +12 Vdc, 0.0 A
Bus loads	1.4 ac 1.0 dc

Operating System Support

MicroVMS	Version 4.2 and later
ULTRIX-32m	Version 2.0 and later
VAXELN	Version 2.0 and later

Diagnostic Support

MicroVAX Diagnostic Monitor	Revision 1.03 and later
Self-tests	No

Related Documentation

EK-LPF11-OP

LPV11 Printer User's Manual

LP25 Printer

Performance

Printing speed	300 lines/minute with 64-character set 215 lines/minute with 96-character set
Print technology	Full-character, impact, band
Character spacing	10 characters/inch
Line spacing	6 or 8 lines/inch
Paper slew speed	37.5 cm/second (15 in/second)
Character set	64- or 96-character ASCII (printing and nonprinting characters)
Buffer capacity	132 characters
Paper	Fanfold: 7.6 to 40.6 cm (3 in to 16 in) Multipart forms: up to 6 parts, fanfold carbon Thickness: 0.06 cm (0.025 in)

Power Requirements

Line voltage and frequency	90–132 Vac, at 60 Hz 190–250 Vac, at 50 Hz
Interface (controller) current	1.5 A at 5 Vdc
Power consumption	350 W
Heat dissipation	1,200 Btu/hour

Physical Characteristics

Height	111 cm (43.8 in)
Width	76 cm (30.3 in)
Depth	85 cm (33.6 in)

Physical Characteristics

Weight	89 kg (195 lb)
--------	----------------

Ordering Information

LP25-BA	LP25 printer
LPV11-B	LPV11/LP25 printer system

Operating System Support

MicroVMS	Version 4.2 and later
ULTRIX-32m	Version 2.0 and later
VAXELN	Version 2.0 and later

Diagnostic Support

MicroVAX Diagnostic Monitor	Revision 1.03 and later
Self-tests	Yes

LP26 Printer

Performance

Printing speed	600 lines/minute with 64-character set 215 lines/minute with 96-character set
Print technology	Full-character, impact, band
Character spacing	10 characters/inch
Line spacing	6 or 8 lines/inch
Paper slew speed	37.5 cm/second (15 in/second)
Character set	64- or 96-character ASCII (printing and nonprinting characters)
Buffer capacity	132 characters
Paper	Fanfold: 7.6 cm to 40.6 cm (3 in to 16 in)

Performance

Multipart forms: up to 6 parts, fanfold carbon
Thickness: 0.06 cm (0.025 in)

Power Requirements

Line voltage and frequency	90–132 Vac, at 60 Hz 190–250 Vac, at 50 Hz
Interface (controller) current	1.5 A at 5 Vdc
Power consumption	475 W
Heat dissipation	1,619 Btu/hour

Physical Characteristics

Height	111 cm (43.8 in)
Width	76 cm (30.3 in)
Depth	85 cm (33.6 in)
Weight	89 kg (195 lb)

Ordering Information

LP26-EB	LP26 printer
LPV11-F	LPV11/LP26 printer system

Operating System Support

MicroVMS	Version 4.2 and later
ULTRIX-32m	Version 2.0 and later
VAXELN	Version 2.0 and later

Diagnostic Support

MicroVAX Diagnostic Monitor	Revision 1.03 and later
Self-tests	Yes

LP27 Printer

Performance

Printing speed	1,200 lines/minute with 64-character set 800 lines/minute with 96-character set
Print technology	Full-character, impact, band
Character spacing	10 characters/inch
Line spacing	6 or 8 lines/inch
Paper slew speed	127 cm/second (50 in/second)
Character set	64- or 96-character ASCII (printing and nonprinting characters)
Buffer capacity	132 characters
Paper	Fanfold: 8.9 cm to 47.6 cm (3.5 in to 18.8 in) Multipart forms: up to 6 parts, fanfold carbon Thickness: 0.05 cm (0.020 in)

Power Requirements

Line voltage and frequency	90–132 Vac, at 60 Hz 190–250 Vac, at 50 Hz
Interface (controller) current	1.5 A at 5 Vdc
Power consumption	455 W, standby; 1100 W, printing
Heat dissipation	3,754 Btu/hour

Physical Characteristics

Height	124.5 cm (49 in)
Width	99.9 cm (35 in)
Depth	96.5 cm (38 in)
Weight	257.2 kg (567 lb)

Ordering Information

LP27-UA	LP27 printer (120 V)
LP27-UB	LP27 printer (240 V)

Operating System Support

MicroVMS	Version 4.2 and later
ULTRIX-32m	Version 2.0 and later
VAXELN	Version 2.0 and later

Diagnostic Support

MicroVAX Diagnostic Monitor	Revision 1.03 and later
Self-tests	Yes

Related Documentation

EK-0LP27-UG	LP27 Lineprinter User's Guide
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2.4.2 LA210 Letterprinter

The LA210 letterprinter is a multimode, dot-matrix, desktop printer.

Performance

Print speed	240 characters/second (draft mode) 40 characters/second (letter mode) 80 characters/second (memo mode), optional
Throughput speed	185 characters/second (draft mode) 30 characters/second (letter-quality mode)
Print technology	Bidirectional, dot matrix
Print matrix	Draft-quality: 7 x 9 dots per character cell Near letter-quality: 33 x 18 dots per character cell Memo-quality: 33 x 9 dots per inch

Performance

Character sets	ASCII, Multinational, Line Drawing Set are standard. Other character sets available on optional cartridges.
Fonts	Courier 10 is standard. Other fonts available on optional cartridges.

Communications

Baud rates	50, 75, 110, 134.5, 200, 300, 600, 1200, 1800, 2400, 4800, 7200, or 9600
Parity	No parity, 7-bit, mark No parity, 7-bit, space Even parity, 7-bit; odd parity, 7-bit Even parity, 8-bit; odd parity, 8-bit No parity, 8-bit
Interface	RS-232-C Optional parallel interface

Paper

Type	Single sheet, pinfeed or continuous forms
Dimensions	8.9 to 37.8 cm (3.5 to 14.9 in) wide
Multiple forms	Original plus 3 parts (bottom feed only)
Thickness	0.038 cm (0.015 in) maximum

Power Requirements

Voltage	120 V nominal (90–128 Vac range) 240 V nominal (180–256 Vac range)
Frequency	47 to 63 Hz
Power consumption	154 W, printing maximum

Physical Characteristics

Height	12.7 cm (5 in) without tractor 22.8 cm (9 in) with tractor
Width	54.6 cm (21.5 in)
Depth	34.3 cm (13.5 in)
Weight	12.15 kg (27 lb)

Ordering Information

LA210-AA	United States (English)
LA210-AE	UK/Ireland (English)
	Other country-specific models are available

Operating System Support

MicroVMS	Dependent on serial interface port
ULTRIX-32m	Dependent on serial interface port
VAXELN	Dependent on serial interface port

Diagnostic Support

MicroVAX Diagnostic Monitor	Dependent on serial interface port
Self-tests	Yes

Related Documentation

EK-LA210-UG	LA210 Letterprinter User Guide
EK-LA210-IN	Installing the LA210 Letterprinter
EK-LA210-RM	LA210 Letterprinter Programmer Reference Manual

2.4.3 LQP Series Printers

The LQP series of printers provides letter-quality printing for MicroVAX II systems.

LQP02 Printer

The LQP02 letter-quality printer is a full-size, 96-petal daisywheel printer.

Performance

Print speed	32 characters/second (letter-quality, Shannon text)
Print technology	Bidirectional, full-character, impact
Print density	Full-character, even density
Character pitch	Variable pitch, software selectable (10 characters/inch default)
Line spacing	Variable, includes proportional spacing (6 lines/inch default)
Vertical slew speed	5 in/second
Buffer capacity	256 characters
Buffer control	XON/XOFF
Paper type	Cutsheet: 7.6 cm to 34.3 cm (3 to 13.5 in) wide Fanfold: 7.6 cm to 38.1 cm (3 to 15 in) wide
Paper thickness	0.025 cm (0.011 in) maximum

Communications

Baud rates	75, 110, 134.5, 150, 200, 300, 600, 1200, 1800, 2000, 2400, 3600, 4800, 7200, and 9600, full-duplex transmission
Data interface	Serial RS232-C EIA standard
Parity	7-bit, odd, even, mark, or space

Power Requirements

LQP02-AA	120 Vac, 60 Hz
LQP02-AD	240 Vac, 50 Hz
Power consumption	120 W, average RMS

Physical Characteristics

Width	63.5 cm (25 in)
Depth	40.6 cm (16 in)
Height	17.8 cm (7 in)
Weight	22 kg (48 lb)

Ordering Information

LQP02-AA	LQP02 printer (120 V)
LQP02-AD	LQP02 printer (240 V)

Operating System Support

MicroVMS	Dependent on serial interface port
ULTRIX-32m	Dependent on serial interface port
VAXELN	Dependent on serial interface port

Diagnostic Support

MicroVAX Diagnostic Monitor	Dependent on serial interface port
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Related Documentation

AA-L662A-TK	Installing and Using the LQP02 Printer
EK-LQP02-RM	LQP02 Printer Programmer Reference Manual

LQP03 Printer

The LQP03 letter-quality printer is a compact, 130-petal daisywheel printer.

Performance

Print speed	25 characters/second (Shannon text at 10 characters/inch) 34 characters/inch (triple-A text at 12 characters/inch)
Print technology	Bidirectional, full-character, impact
Print density	Full-character, even density
Cutsheet paper size	U.S.: 21.6 x 27.9 cm (8.5 x 11 in); A4: 21.1 x 29.7 cm (8.3 x 11.7 in); both in vertical and horizontal orientation; 16–24 lb bond

Type Characteristics

Character sets	ASCII, English/U.K., French, French-Canadian, German, Italian, Spanish, Swedish, Finnish, Norwegian, Danish, JIS Roman, Multinational
Character pitches	Printwheels available in 10, 12, and 15 pitch
Maximum print columns	110 at 10 pitch, 132 at 12 pitch, 165 at 15 pitch
Margins	Left, right, top, and bottom
Tabs	256 contiguous horizontal; 168 contiguous vertical
Character code	7-bit and 8-bit ASCII, switch-selectable
Horizontal pitch	Variable pitch, software-selectable
Vertical pitch	Variable pitch, software-selectable
Horizontal resolution	120 increments/inch
Lines/inch	Variable, includes proportional spacing (6 lines/inch default)
Characters/inch	Variable (10 characters/inch default)

Communications

Baud rates	110, 150, 300, 600, 1200, 2400, 4800, and 9600
Data interface	Serial RS232–C EIA standard

Communications

Parity	Odd, even, mark, or space, switch-selectable
Transmission rate	Full-duplex, from 110 to 9600 baud
Buffer capacity	256 characters
Buffer control	XON/XOFF

Power Requirements

Voltage/Frequency	90–132 V, 57 to 63 Hz; 180–264 V, 47 to 53 Hz
Line current	14 A, maximum starting current; 1 A nominal operating current
Power consumption	Less than 100 W, average RMS
Heat dissipation	410 Btu/hour, nominal operation

Physical Characteristics

Width	52.7 cm (20.75 in)
Depth	38.7 cm (15.25 in)
Height	19.7 cm (7.75 in)
Weight	22.7 kg (28 lb)

Ordering Information

LQP02-A	LQP03 printer (120 V)
LQP02-B	LQP03 printer (240 V)

Operating System Support

MicroVMS	Dependent on serial interface port
ULTRIX-32m	Dependent on serial interface port
VAXELN	Dependent on serial interface port

Diagnostic Support

MicroVAX Diagnostic Monitor	Dependent on serial interface port
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Related Documentation

EK-LQP03-UG	Installing and Using the LQP03 Printer
EK-LQP03-RM	LQP03 Printer Programmer Reference Manual
EK-LQP03-TM	LQP03 Printer Technical Manual

2.4.4 LN03 Laser Printer

The LN03 laser printer is a desktop unit that uses laser imaging and xerographic printing.

Performance

Print speed	Eight pages/minute (about 333 characters/second letter-quality, 2,500 characters/page)
Recommended duty cycle	3,500 pages/month
Paper feed	Adjustable 250-sheet cassette (16 to 24 lb paper)
Paper output	250 sheets sequenced
Print orientation	Portrait: 66 lines/page, 120 characters/line Landscape: 66 lines/page, 150 characters/line
Resolution	300 x 300 dots per inch
Image area	2400 dots/scan line x 3225 scan lines (ANSI A) 2400 dots/scan line x 3400 scan lines (A4)
Paper sizes	Standard ANSI A: 21.6 x 27.9 cm (8.5 x 11 in) European A4: 21 x 29.7 cm (8.3 x 11.7 in)
Character sets	Built-in: ASCII, DEC Supplemental, DEC Technical, and Line Drawing Downline-loaded: 10 additional available

Performance

Fonts	16 resident fonts; others available on ROM cartridges or by downline loading them from a host
Graphics	Sixel protocol

Communications

Interfaces	CCITT V2.4 RS232
Baud rates	1200, 2400, 3600, 4800, 7200, 9600, 19200
Parity	If enabled, even/mark or odd/space

Power Requirements

Voltage/Frequency	90–128 V at 50/60 Hz; 190–256 V at 50 Hz
Power consumption	1 kVA max
Heat dissipation	3,400 Btu/hour

Physical Characteristics

Height	38.1 cm (15 in) with exit tray
Width	53.4 cm (21 in)
Depth	59.7 cm (23.5 in) with tray
Weight	36.3 kg (80 lb)

Ordering Information

LN03-AA	U.S. model
LN03-AE	UK/Ireland model
	21 other country-specific models available

Operating System Support

MicroVMS	Dependent on serial interface port
ULTRIX-32m	Dependent on serial interface port

Operating System Support

VAXELN	Dependent on serial interface port
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Diagnostic Support

MicroVAX Diagnostic Monitor	Dependent on serial interface port
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Related Documentation

EK-0LN03-UG	Installing and Using the LN03
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EK-0LN03-RM	LN03 Programmer Reference Manual
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Chapter 3

System Expansion

Expanding a system involves three kinds of activities:

- Determining whether the system can accommodate a particular set of supported options
- Configuring the options appropriately
- Installing the options in the correct positions within the system

This chapter describes only how to determine what options you can add to your system. You do this by filling in a worksheet with the options currently in your system and those you want to add. The information you need for all options is in Table 3-1.

This chapter does not describe how to configure the new options or how to install them into your system. Configuring the option involves assigning a Control and Status Register (CSR) address and an interrupt vector. This is usually done by means of switches or jumpers on the options themselves. Your DIGITAL service representative configures the options when he/she installs them. Your DIGITAL service representative also determines the proper placement of options within the system according to specific guidelines.

Self-maintenance customers may obtain the information required to configure and install modules by ordering the *MicroVAX System Maintenance Guide*.

3.1 Determining Expansion Capacity

To determine what you can add to your system, you must list the options currently installed and their power requirements in the worksheet provided at the end of this chapter. Table 3-1 lists the information you need for each option supported in the BA23 enclosure.

Table 3-1: Power Requirements

Option	Module	Current (Amps)		Power (Watts)
		+5V	+12V	
KA630-AA	M7606	6.2	0.14	32.7
MS630-AA	M7607	1.0	0.0	5.0
MS630-BA	M7608	1.3	0.0	6.5
MS630-BB	M7608-BA	1.0	0.0	5.0
MS630-CA	M7609	2.11	0.0	10.55
DPV11	M8020	1.2	0.3	9.6
DRV11	M7941	0.9	0.0	4.5
LPV11	M8027	0.8	0.0	4.0
DLVJ1	M8043	1.0	0.25	8.0
DZV11	M7957	1.2	0.39	10.7
DZQ11	M3106	1.0	0.36	9.32
DMV11-N	M8064	3.4	0.4	21.8
DHV11	M3104	4.5	0.55	29.1
DEQNA	M7504	3.5	0.5	23.5
RQDX3	M7555	2.48	0.06	13.2
TQK50	M7546	2.9	0.0	14.5
RX50		0.85	1.8	25.9
RX33		0.5	0.3	5.6
RD52		1.0	2.5	35.0
RD53		0.9	2.5	34.5
RD54		1.7	1.57	27.4
TK50		1.35	2.4	33.55

Table 3-1 (Cont.): Power Requirements

Option	Module	Current (Amps)		Power (Watts)
		+5V	+12V	
KMV1A-M	M7500	2.6	0.2	15.4
IEQ11	M8634	3.0	0.0	15.0
RRD50	M7552	3.0	0.0	15.0
TSV05	M7196	6.5	0.0	32.5

Figure 3-1 has the worksheet for the BA23 enclosure. Use the worksheet as follows:

1. List all options currently installed in the system, except the controllers for the fixed-disk drives and tape drive. Begin with the CPU and memory options.
2. List the options you would like to add to the system.
3. List the controllers for the TK50 tape drive and disk/diskette drives last.
4. Using the information from Table 3-1, list the power requirements for each module and each mass storage device.
5. Add each column and make sure the resultant figure does not exceed the limit listed below the column. As long as the figure is within range, the listed options can be installed in the system.

This worksheet is a guide. Confirm your system expansion plans with your DIGITAL sales representative. While certain combinations of options may be possible from a hardware standpoint, they may not be recommended, depending on the nature of your application software.

Figure 3-1: BA23 Configuration Worksheet

ADD THESE COLUMNS

BACKPLANE SLOT	MODULE	CURRENT (AMPS)		POWER (WATTS)	I/O PANEL INSERTS	
		+5 V	+12 V		B (2 x 3)	A (1 x 4)
1 AB CD						
2 AB CD						
3 AB CD						
4 AB CD						
5 AB CD						
6 AB CD						
7 AB CD						
8 AB CD						
MASS STORAGE						
1						
2						

TOTAL THESE COLUMNS:

MUST NOT EXCEED:

36.07.023042*

* IF MORE THAN TWO TYPE A FILTER CONNECTORS ARE REQUIRED, AN ADAPTER TEMPLATE (PN 74-27740-01) MAY BE USED. THIS ALLOWS THREE ADDITIONAL TYPE A FILTER CONNECTORS, BUT REDUCES THE AVAILABLE TYPE B CUTOUTS TO TWO.

MR-15964

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HOW TO ORDER

ADDITIONAL DOCUMENTATION

From	Call	Write
Alaska, Hawaii, or New Hampshire	603-884-6660	Digital Equipment Corporation P.O. Box CS2008 Nashua, NH 03061
Rest of U.S.A. and Puerto Rico*	800-258-1710	
* Prepaid orders from Puerto Rico must be placed with DIGITAL's local subsidiary (809-754-7575)		
Canada	800-267-6219 (for software documentation) 613-592-5111 (for hardware documentation)	Digital Equipment of Canada Ltd. 100 Herzberg Road Kanata, Ontario, Canada K2K 2A6 Attn: Direct Order desk
Internal orders (for software documentation)	—	Software Distribution Center (SDC) Digital Equipment Corporation Westminster, MA 01473
Internal orders (for hardware documentation)	617-234-4323	Publishing & Circulation Serv. (P&CS) NR03-1/W3 Digital Equipment Corporation Northboro, MA 01532

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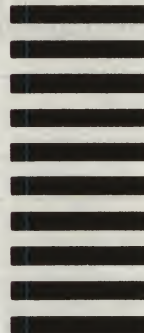
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